REMARKS

Claims 1-6 have been canceled, and claims 7-18 added to the application. Further, the title, the specification, Figures 1-4, 7b, and 7c, and the Abstract have been amended. The Applicant has carefully and thoughtfully considered the Office Action and the comments therein. For the reasons given below, it is submitted that this application is in condition for allowance.

1. As noted above, a Substitute Specification is concurrently filed with this Amendment. The Substitute Specification incorporates the amended title, adds section headings to the application, makes editorial changes to the specification, and includes the above-mentioned amended Abstract. A marked-up copy of the original specification showing which portions of the original specification are being added and deleted is concurrently filed. Furthermore, Applicant's representative asserts that, to the best of his knowledge, the Substitute Specification includes no new matter and includes the same changes as are indicated in the marked-up copy of the original specification.

2. In the Office Action on page 2 in section 1, the drawings are objected to because of the German text therein. In response, a Request for Approval of Drawing Changes is submitted correcting the German text for Figures 1-4, 7b, and 7c.

3. In the Office Action on pages 2-4 in section 3, claims 1-6 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,410,470 to Yamaoka et al. (hereinafter Yamaoka). Applicants respectfully traverse this rejection.

Initially, it is noted that claims 1-6 are canceled and replaced by claims 7-12.

As per claim 7, a control unit is recited as comprising a temporally discrete dynamic fuzzy logic control element having at least one integrating transfer characteristic and/or differentiating transfer characteristic and comprising a memory device to store a current internal state variable of a fuzzy logic control element, where the current internal state variable is based on fuzzy logic conclusions. Yamaoka fails to teach the recited limitations for at least three reasons.

First, Yamaoka fails to teach a fuzzy logic control element having at least one integrating transfer characteristic and/or differentiating transfer characteristic. Yamaoka teaches a fuzzy controlling means 11 in Figures 1 and 3 having fuzzy rules. Yamaoka, column 4, lines 6-9; column 5, lines 23-26; column 6, line 47 to column 8, line 9. Yamaoka also teaches PID (Proportional-Integrating-Differentiating) control as part of its prior art discussion. Yamaoka, column 1, lines 24-36. However, the fuzzy rules of Yamaoka are **not** directed to PID control and do **not** include at least one integrating transfer characteristic and/or differentiating transfer characteristic. Hence, Yamaoka fails to teach claim 7 for a first reason.

Second, Yamaoka fails to teach a current internal state variable of a fuzzy logic control element. The fuzzy controlling means 11 in Figures 1 and 3 of Yamaoka does not illustrate any current internal state variable, and Yamaoka further fails to teach such a variable. The input of the fuzzy controlling means 11 is obtained from the deviation value calculating means 10, which subtracts the output predicted value y from the set point value Href. Yamaoka, column 4, lines 39-41. This calculated difference is analyzed by the fuzzy rule groups having membership function groups 110-119 to obtain a fuzzy output u', which is defuzzified with the defuzzy processing means 120 to obtain the manipulating variable u. Yamaoka, Figure 1; column 4, lines 29-33. The fuzzy controlling means 11 processes the calculated difference from the deviation

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value calculating means 10 and does **not** include a current internal state variable. Hence, Yamaoka fails to teach the limitations of claim 7 for a second reason.

Third, Yamaoka fails to teach a fuzzy logic control element comprising a memory device storing a current internal state variable. Yamaoka teaches a control apparatus 1 having a fuzzy controlling means 11, an I/O apparatus 3, a prediction calculating unit 12, and a deviation value calculating means 10. Yamaoka, column 4, lines 6-9; column 5, lines 23-26. The fuzzy controlling means 11 includes fuzzy rules and a defuzzy processing means 120. Yamaoka, column 4, lines 23-26; column 6, line 47 to column 8, line 9. As illustrated in Figure 1, the fuzzy rules include fuzzy rule groups having membership function groups 110-114 of rule condition parts and membership function groups 115 to 119 of rule conclusion parts. Yamaoka, column 4, lines 16-23. As discussed above, the fuzzy controlling means 11 does **not** include a current internal state variable.

Yamaoka further teaches that the fuzzy rule groups and the membership functions 110-119 are stored in a storage apparatus and then are read out to a CPU. Yamaoka, column 4, lines 26-29. The storage apparatus can be the memory 3002 in Figures 18A-18C, the processing of the fuzzy rule groups and the membership functions 110-119 can be accomplished by the microprocessor 3001 in Figure 18A or the fuzzy chip 3005 in Figures 18B and 18C, and the defuzzy processing means 120 can be accomplished using the microprocessor 3001 in Figures 18A and 18B or the microprocessor 3006 in Figure 18C. Yamaoka, column 12, lines 1-6, 10-20 and 26-31. Yamaoka, however, fails to teach that the memory 3002 stores anything but the fuzzy rule groups and the membership functions 110-119. The memory 3002 of Yamaoka does **not** store a current internal state variable of the fuzzy controlling means 11. Hence, Yamaoka fails to teach the recited limitations of claim 7 for a third reason.

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Claims 8-12 are dependent from claim 7 and are allowable as being dependent from an allowable claim.

Further, claim 9 recites the fuzzy logic control element further comprising at least one first static fuzzy logic device to update the current internal state variable of the fuzzy logic control element. As explained above for claim 7, Yamaoka fails to teach a current internal state variable of the fuzzy controlling means 11. Because of this failing, Yamaoka can not teach **updating** a current internal state variable of the fuzzy controlling means 11. Hence, Yamaoka fails to teach the limitations of claim 9.

In addition, claim 10, which depends from claims 7 and 9, recites the fuzzy logic control element further comprising at least one second static fuzzy logic device to update an output variable of the fuzzy logic control element. In combination with claim 9, Yamaoka fails to teach at least one **first** static fuzzy logic device **and** at least one **second** static fuzzy logic device. Hence, Yamaoka fails to teach the limitations of claim 10.

Claim 11 recites that the current internal state variable of the fuzzy logic control element is based on a processing state in at least one succession of processing states. As discussed above for claim 7, Yamaoka fails to teach the fuzzy controlling means 11 generating a current internal state variable. Because of this failing Yamaoka can not teach a current internal state variable based on a **processing state** in at least one **succession of processing states**. Further, even though Yamaoka teaches fuzzy rule groups having membership function groups 110-119, these fuzzy rule groups do **not** correspond to a succession of processing states. Yamaoka, column 4, lines 16-23; column 6, line 47, to column 8, line 9. Hence, Yamaoka fails to teach the limitations of claim 11.

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Claim 13 is an added independent claim and recites limitations similar to those recited in claim 7. For the same reasons discussed above for claim 7, claim 13 is allowable over <u>Yamaoka</u>.

Claims 14 and 15 depend from claim 13 and are allowable as being dependent from an allowable claim.
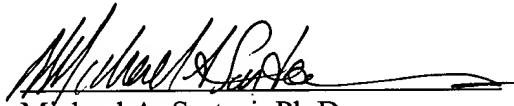
Claim 16 is an added independent claim and recites limitations similar to those recited in claim 7. For the same reasons discussed above for claim 7, claim 16 is allowable over <u>Yamaoka</u>.

Claims 17 and 18 depend from claim 16 and are allowable as being dependent from an allowable claim.

THEREFORE, because all objections and rejections have been overcome, it is submitted that claims 7-18 are allowable, and such allowance is requested.

Respectfully submitted,

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